

Claims

What is claimed is:

1. A method for providing distributing communication routing, the method comprises the steps of:
 - a) obtaining registration information from a plurality of forwarding engines;
 - b) identifying the plurality of forwarding engines based on the registration information; and
 - c) providing control information to at least one forwarding engine of the plurality of forwarding engines for at least one of: distributed routing maintenance and a specific data forwarding operation.
2. The method of claim 1, wherein providing control information further comprises providing control information for distributed routing maintenance such that the control information includes a control message that requests verification of present functionality of the at least one forwarding engine.
3. The method of claim 2, wherein the present functionality includes information indicating a state of each interface associated with the at least one forwarding engine.
4. The method of claim 2, further comprises:
 - d) determining the present functionality of the at least one forwarding engine;
 - e) updating registration information of the plurality of forwarding engines based on the present functionality.
5. The method of claim 4, wherein determining the present functionality further comprises determining the present functionality based on at least one of: a response from

the at least one forwarding engine, and a lack of response from the at least one forwarding engine.

6. The method of claim 1 further comprises performing a plurality of data forwarding operations based on at least one forwarding table, wherein when a specific data forwarding operation is indicated by the control information, performing the specific forwarding operation based on additional control information provided in the control information.

7. The method of claim 1, wherein providing control information further comprises providing the control information for a specific data forwarding operation, wherein the control information includes a control message that includes at least one data packet and instructions determining how the at least one forwarding engine is to forward the at least one data packet.

8. The method of claim 7, wherein the control message is a tunneling data message, wherein the at least one data packet included in the tunneling data message includes at least one router packet directed to at least one router operably coupled to the at least one forwarding engine, wherein the at least one forwarding engine forwards the at least one router packet to the at least one router, wherein the registration information includes information describing couplings between the plurality of forwarding engines and routers.

9. The method of claim 1, wherein the control information further comprises packet configuration information, wherein the packet configuration information determines packet formats of packets exchanged between forwarding engines.

10. The method of claim 1, wherein providing control information further comprises providing the control information via a plurality of traffic flows that provide data to the plurality of forwarding engines, wherein the plurality of traffic flows allow for varying

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levels of service with respect to subsets of the plurality of forwarding engines, wherein each subset includes at least one forwarding engine.

11. The method of claim 1, wherein providing control information further comprises providing the control information to a portion of the plurality of forwarding engines via a shared traffic flow.

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12. A distributed communications routing circuit comprising:

a plurality of forwarding engines that are interoperably coupled to permit data exchange; and

a route computation engine operably coupled to the plurality of forwarding engines, wherein the route computation engine receives registration information from the plurality of forwarding engines, wherein the registration information includes coupling information describing couplings amongst the plurality of forwarding engines and a plurality of external routers, wherein the route computation engine provides control information to at least one forwarding engine of the plurality of forwarding engines for at least one of : distributed routing maintenance and a specific forwarding operation.

13. The circuit of claim 12, wherein the control information includes at least one status request, wherein the at least one forwarding engine provides a status response to the route computation engine in response to the status request, wherein the status response indicates present functionality of the at least one forwarding engine.

14. The circuit of claim 13, wherein the present functionality of the forwarding engine includes state of each interface associated with the forwarding engine.

15. The circuit of claim 14, wherein the route computation engine updates registration information of the forwarding engine based on the status response.

16. The circuit of claim 12, wherein at least a portion of the plurality of forwarding engines are grouped into at least one forwarding engine grouping, wherein the at least one forwarding engine grouping is coupled to the route computation engine via a shared traffic flow.

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17. The circuit of claim 12, wherein the plurality of forwarding engines are coupled to the route computation processor via a plurality of connections, wherein the plurality of connections provide a plurality of levels of service for providing control information to the plurality of forwarding engines.

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18. A distributed network routing element comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to (a) obtain registration information from a plurality of forwarding engines; (b) identify the plurality of forwarding engines based on the registration information; and (c) provide control information to at least one forwarding engine of the plurality of forwarding engines for at least one of: distributed routing maintenance and a specific data forwarding operation.

19. The distributed network routing element of claim 18, wherein the memory further comprises operational instructions that cause the processing module to provide control information for distributed routing maintenance such that the control information includes a control message that requests verification of present functionality of the at least one forwarding engine.

20. The distributed network routing element of claim 19, wherein the present functionality includes information indicating a state of each interface associated with the at least one forwarding engine.

21. The distributed network routing element of claim 18, wherein the memory further comprises operational instructions that cause the processing module to: d) determine the present functionality of the at least one forwarding engine; and e) update registration information of the plurality of forwarding engines based on the present functionality.

22. The distributed network routing element of claim 21, wherein the memory further comprises operational instructions that cause the processing module to determine the present functionality based on at least one of: a response from the at least one forwarding engine, and a lack of response from the at least one forwarding engine.

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23. The distributed network routing element of claim 18, wherein the memory further comprises operational instructions that cause the processing module to issue a tunneling data message, wherein at least one data packet is included in the tunneling data message, wherein the at least one data packet is directed to at least one router operably coupled to the at least one forwarding engine, wherein the at least one forwarding engine forwards the at least one router packet to the at least one router, wherein the registration information includes information describing couplings between the plurality of forwarding engines and routers.

24. The distributed network routing element of claim 18, wherein the control information further comprises packet configuration information, wherein the packet configuration information determines packet formats of packets exchanged between forwarding engines.

25. The distributed network routing element of claim 18, wherein the memory further comprises operational instructions that cause the processing module to provide the control information via a plurality of traffic flows that provide data to the plurality of forwarding engines, wherein the plurality of traffic flows allow for varying levels of service with respect to subsets of the plurality of forwarding engines, wherein each subset includes at least one forwarding engine.